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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/023,667	12/21/2001	Takashi Iizuka	P21408	6315

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RESTON, VA 20191

EXAMINER
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ALLEN, DENISE S

ART UNIT	PAPER NUMBER
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2872

DATE MAILED: 06/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<p align="center"><b>Office Action Summary</b></p>	<p>Application No.</p> <p>10/023,667</p>	<p>Applicant(s)</p> <p>IIZUKA, TAKASHI</p>	
	<p>Examiner</p> <p>Denise S Allen</p>	<p>Art Unit</p> <p>2872</p>	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 March 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 9 is/are rejected.
- 7) ☒ Claim(s) 7,8 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                                   | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>03/10/04</u> .  | 6) <input type="checkbox"/> Other: _____                                    |

**DETAILED ACTION*****Response to Arguments***

In the Applicant's response on March 10, 2004, the Applicant argues with respect to claims 1 and 9, that Kamikubo ('029) fails to teach or reasonably suggest the plurality of laser beams are directed outside the predetermined imaging area by at least one lens element in the imaging optical system as recited in claims 1 and 9 (pages 2 – 3). This argument has been fully considered and not found to be persuasive. The Examiner respectfully disagrees with the Applicant's argument. Kamikubo ('029) teaches that both of the lens elements (references 18a and 18b) of the imaging optical system (reference 18) direct the plurality of laser beams (at the ends of the lens elements closest to the reference indicators) outside the predetermined imaging area (references  $L_0$  and  $L_1$  are outside of reference 19). The Examiner further notes that the prism (reference 25) discussed in the Applicant's arguments is not relied upon in the rejection of claims 1 and 9; and claims 1 and 9 do not preclude the existence of additional elements such as the prism.

The Applicant further argues with respect to claims 1 and 9, that Kamikubo ('029) fails to teach or reasonably suggest that the laser beams directed to the imaging area are aligned in the scanning direction, while the laser beams directed to the beam detector are shifted in the scanning direction as recited in claims 1 and 9 (pages 2 – 3). This argument has been fully considered and not found to be persuasive. The Examiner respectfully disagrees with the Applicant's argument. Kamikubo ('029) teaches that the laser beams directed to the imaging area are aligned in the scanning direction (Figure 2 at reference  $t_2$ ), while the laser beams directed to the beam detector are shifted in the scanning direction (references  $L_0$  and  $L_1$  are shifted apart as shown in Figure 1 before reference 25).

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The Applicant further argues with respect to claims 4 – 8, that one of ordinary skill in the art would not be motivated to provide a diffracting surface (the combination of Kamikubo ‘029 and ‘164) in order to achieve the optical characteristic (in claim 1) as recited in claim 4 (pages 4 – 5). This argument has been fully considered and not found to be persuasive. The Examiner respectfully disagrees with the Applicant’s argument. The Examiner respectfully points out that the motivation given in the rejection of claim 4 in the previous office action (page 4) is not to achieve the optical characteristic recited in claim 1, but rather to reduce the difference in the width of the imaging areas for each of the laser beams (Kamikubo (‘029) column 6 lines 25 – 28 and Kamikubo (‘164) column 4 lines 34 – 36). The Examiner further notes that the optical characteristic has already been met in the rejection of claim 1.

The Applicant further argues with respect to claim 7, that the combination of Kamikubo ‘029 and ‘164 fails to teach or reasonably suggest an imaging optical system having first and second ranges along the scanning direction wherein the lateral chromatic aberration is compensated for in the first range and not compensated for in the second range as recited in claim 7 (pages 5 – 7). This argument has been fully considered and found to be persuasive. The Examiner agrees that Kamikubo does not teach a compensated range and an un-compensated range.

The rejection of claims 7 and 8 under 35 U.S.C. 103(a) as being unpatentable over Kamikubo (‘029) in view of Kamikubo (‘164) in the Office Action on September 10, 2003 has been withdrawn.

### *Claim Objections*

Claims 7 and 8 are objected to because of the following informalities: the limitation “a first range and a second range along a scanning direction” (claim 7 lines 11 – 12) is unclear. Suggested correction: replace the limitation with “a first area and a second area on an incident surface of the imaging optical system” and replace all subsequent recitations of the “first range” and the “second range” with “first area” and “second area” respectively. Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1 – 3 and 9 are rejected under 35 U.S.C. 102(a) as being anticipated by Kamikubo (US 6,178,029).

Regarding claims 1 and 9, Kamikubo ('029) teaches a scanning optical system (Figure 1) for exposing a predetermined imaging area (Figure 3 between  $P_1$  and  $P_2$ ) on a surface (reference 19) to be scanned to a plurality of laser beams (column 3 lines 6 – 17), comprising: a plurality of light sources (references 11 and 12) that emit a plurality of laser beams having different wavelengths (column 5 lines 31 – 33), respectively; a single deflector (reference 17) which deflects the plurality of laser beams simultaneously (Figures 2 and 3); an imaging optical system (reference 18) that converges the plurality of laser beams deflected by said single deflector on the surface to be scanned; and a beam detector (reference 20) that receives the plurality of laser beams directed to outside of the predetermined imaging area (outside reference 19) via at least one lens element (references 18a and 18b) included in said imaging optical system, a synchronizing signal being generated upon detection of each of the plurality of light beams by

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said beam detector (column 5 lines 10 – 16), an optical characteristic of said imaging optical system being configured such that the laser beams directed to said predetermined imaging area are aligned in a scanning direction (Figure 3 reference P<sub>3</sub>), while the laser beams directed to said beam detector are shifted in the scanning direction (references L<sub>0</sub> and L<sub>1</sub>).

Regarding claim 2, Kamikubo ('029) teaches the single deflector comprises a polygonal mirror having a plurality of reflecting surfaces (column 4 line 47), one of said plurality of reflecting surfaces reflecting the plurality of laser beams during each scan (column 4 lines 50 – 52), said polygonal mirror being rotated so that the laser beams reflected by said reflecting surface scan (column 4 lines 47 – 49).

Regarding claim 3, Kamikubo ('029) teaches the beam detector comprises a single light receiving element (reference 20), each of the plurality of laser beams being incident on said single light receiving element (column 5 lines 10 – 16).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4 – 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamikubo ('029) in view of Kamikubo (US 6,115,164).

Regarding claims 4 and 5, Kamikubo ('029) teaches a scanning optical system as described above. Kamikubo ('029) further teaches the imaging optical system includes at least one refractive lens element (references 18a and 18b) and that said imaging optical system

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exhibits said optical characteristic (see claim 1 above). Kamikubo ('029) does not teach a diffractive lens structure formed onto said refractive lens element.

Kamikubo ('164) teaches a scanning optical system (Figure 1) with an imaging optical system (references 15, 20, and 30) that includes at least one refractive lens element (i.e. reference 15), and a diffractive lens structure (Figure 3 reference 15a) formed onto said refractive lens element. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the diffractive lens structure of Kamikubo ('164) in a predetermined area on a surface of the refractive lens element in the path of the laser beams directed to the predetermined imaging area of the surface in the scanning optical system of Kamikubo ('029) in order to reduce the difference in the width of the imaging areas for each of the laser beams (Kamikubo ('029) column 6 lines 25 – 28 and Kamikubo ('164) column 4 lines 34 – 36).

Regarding claim 6, Kamikubo ('164) teaches the diffractive lens structure compensates for a lateral chromatic aberration of said at least one refractive lens element (column 4 lines 34 – 36).

### ***Allowable Subject Matter***

Claims 7 and 8 would be allowable if rewritten or amended to overcome the claim objections set forth in this Office action.

Claims 7 and 8 are allowable over the prior art for at least the reason the prior art fails to teach and/or suggest an imaging optical system having first and second areas on the incident surface of the imaging optical system (ranges along the scanning direction) wherein the lateral chromatic aberration is compensated for in the first area (range) and not compensated for in the second area (range) as set forth in the claimed combination.

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***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Denise S Allen whose telephone number is (571) 272-2305. The examiner can normally be reached on Monday - Friday, 9:00am - 5:30pm.

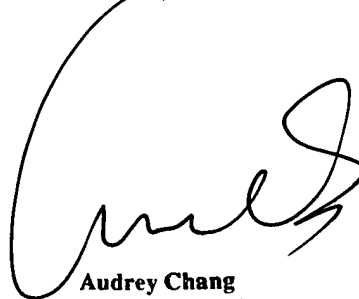
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew A Dunn can be reached on (571) 272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



dsa

Denise S Allen  
Examiner  
Art Unit 2872



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